

## New NMFS Scientific Reports Published

Some publications listed below may be sold by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Copies of all are sold by the National Technical Information Service, Springfield, VA 22151. Writing to either agency prior to ordering is advisable to determine availability and price (prices may change and prepayment is required).

NOAA Technical Report NMFS 20. Kendall, Arthur W., Jr., and Jean R. Dunn. "Ichthyoplankton of the continental shelf near Kodiak Island, Alaska." January 1985, iii + 89 p., 5 figs., 7 tables, 87 app. figs.

### ABSTRACT

Eleven ichthyoplankton surveys were conducted (1 in 1972 and 10 between 1977 and 1979) in the northeastern Pacific Ocean over the continental shelf off Kodiak Island, Alaska. In the 677 neuston and 632 bongo tows, eggs or larvae of more than 80 fish taxa were found. They were present in every season and throughout the survey area, although more taxa and more individuals were found in summer than in other seasons. Among the more abundant species were the gadid *Theragra chalcogramma* and several hexagrammids and pleuronectids. The hexagrammids and several cottids were abundant in the neustonic layer, where they spent close to a year as larvae and juveniles. Although the seasonal and geographic distribution of most taxa was complex, two patterns emerged: Late summer-fall spawners produce demer-

sal eggs and have neustonic larvae that remain pelagic for several months (hexagrammids and some cottids), and spring-summer spawners have pelagic eggs and larvae that spend several weeks in the plankton but are not closely associated with the surface (*Theragra chalcogramma*, pleuronectids).

NOAA Technical Report NMFS 21. Renaud, Maurice L. "Annotated bibliography on hypoxia and its effects on marine life, with emphasis on the Gulf of Mexico." February 1985, iii + 9 p.

### ABSTRACT

This bibliography contains 73 annotated references from publications and reports concerning hypoxia,  $\leq 2.0$  ppm dissolved oxygen concentration, in the Gulf of Mexico. Instances of hypoxia from similar habitats and the effects of low oxygen levels on marine or estuarine organisms are also included.

NOAA Technical Report NMFS 22. Raju, Solomon N. "Congrid eels of the

## Game Fish Records of the World

The heart of the International Game Fish Association's annual series entitled "World Record Game Fishes" will probably always be its records listings, and the 1985 edition is no exception. The 65-page Section 4 details for trophy anglers the freshwater and saltwater all-tackle, line class, and fly fishing world records as granted by the International Game Fish Association as of 1 January 1985, and the list of winners in the Ninth Annual IGFA's Fishing Contest (the most entries, interestingly, were for the pink salmon, *Oncorhynchus gorbuscha*); the Tenth Contest is currently underway and certificates are awarded for the three heaviest catches of each species.

But many sportsmen and conservation leaders will find the articles in Section 2 of equal or greater interest. This year it includes a large section of Great Lakes fishing by such outdoor writers as Fred David (Lake Ontario), Maggie Kelch (Lake Erie), Ken Darwin (Lake Michi-

gan), John Power (Lake Huron), and Butch Furtman (Lake Superior). Al Ristori has contributed an in-depth article "The Canyon Revolution," on angling for big game fishes along the U.S. East Coast's continental shelf edge along the middle Atlantic, from Norfolk Canyon to Block and Atlantis Canyons.

IGFA has also reprinted the excellent *Field and Stream* article on the bull and Dolly Varden trouts by A. J. McClane. In another piece, Olaf R. Braekkan, Director of Fisheries at the Institute of Nutrition, Bergen, Norway, provides a concise description of "The Nutritional Value of Fish." And NMFS Director William G. Gordon has contributed a thorough review of "The Why and How of Fisheries Management," outlining for sportsmen the reasons for and needs of game fish management and conservation. Another important article, "History of IGFA," relates the role of sportsmen in establishing the organization and IGFA's role in promoting gamefish conservation and management and angling ethics worldwide. It is well illustrated with historical photographs from IGFA's extensive files.

In addition, Section 5 provides illustrations, charts, and pertinent data to aid anglers in identifying over 150 fresh- and saltwater game fishes, plus a glossary of scientific and descriptive terms, and a multilingual guide to the common names of nearly 70 saltwater game fishes in English, French, German, Hawaiian, Italian, Portuguese, Japanese, and Spanish.

Section 1 provides pertinent data on the IGFA itself and its many programs while several Appendices list U.S. and world angling records-keeping organizations or agencies and worldwide tagging programs. Other useful data include an illustrated guide to fishing knots, charts of water temperature ranges for fresh and saltwater fishes, and a conversion table for weights and measures. In sum, this is an excellent and most useful compendium of data and information for sportsmen and others involved in game fish conservation and angling. The paperbound 304-page volume is sold by the IGFA, 3000 E. Las Olas Blvd., Fort Lauderdale, FL 33316-1616 for \$9.75 postpaid in the United States (\$11.95 to foreign addresses); it is also provided to

eastern Pacific and key to their leptocephali." February 1985, iii + 19 p., 12 figs., 2 tables.

#### ABSTRACT

This study indicates that 13 species of congrid larvae belonging to 8 genera occur in the eastern Pacific. The species are: *Ariosoma gilberti*; *Paraconger californiensis*; *Paraconger* sp.; *P. deniatus*; *Chilconger labiatus*; *Taenioconger digueti*; *T. canabus*; *Gorgasia punctata*; *G. obtusa*; *Gnathophis catalinensis*; *Hildebrandia nitens*; *Bathycongrus macrurus*; and *B. varidens*. The morphological and anatomical changes undergone during metamorphosis are useful in the identification of the larvae. Larvae are distributed closer to the coastal waters, and are more common from January to May than from June to December. A key to the larvae was developed based on the myotomal counts, adult vertebral counts, pigmentation patterns, and the nature of the teeth and tail tip to distinguish the genera and species. This study shows that Garman's unidentified larvae, *Atopichthys acus* and *A. cingulus*, are two different larval stages of *Ariosoma gilberti*, and points out that *Atopichthys deniatus* and *A. obtusus* belong to *Paraconger* and *Gorgasia*, respectively.

NOAA Technical Report NMFS 23. Darcy, George H. "Synopsis of biological data on the pinfish, *Lagodon rhomboides* (Pisces: Sparidae)." February 1985, iv + 32 p., 22 figs., 24 tables.

#### ABSTRACT

Information of the biology and resources of the pinfish, *Lagodon rhomboides* (Pisces: Sparidae), is compiled, reviewed, and analyzed in the FAO species synopsis style.

NOAA Technical Report NMFS 24. Cook, Steven K. "Temperature conditions in the cold pool 1977-81: A comparison between Southern New England and New York transects." February 1985, iii + 22 p., 5 figs., 5 tables, 14 app. figs.

#### ABSTRACT

Expendable bathythermograph data collected by the Ships of Opportunity (SOOP) - Ocean Monitoring Program are analyzed for seasonal and inter-annual variations of the cold pool. Two major SOOP transects

within the Middle Atlantic Bight (Southern New England and New York) have been analyzed for the years common to both (1977-81). During the years 1977-81, over 200 transects were occupied, and almost 3,000 XBT's were dropped.

Results show that the cold pool is formed with the onset of spring warming and persists until fall overturn, is consistent year to year in both area and weighted average annual temperature, and advects water from the northeast to the southwest. Results also show a 100-d lag in minimum temperature between the Southern New England and New York transects. Differences in bathymetry between the two transects and their influence on the cold pool are also discussed. Plots of average (1977-81) bottom temperature for both transects are discussed and show consistent annual weighted mean temperature and areas. Bottom temperature plots for individual years, as well as maximum and minimum bottom temperature plots, are presented as Appendix figures.

NOAA Technical Report NMFS 25. Hargis, William J., Jr. (editor). "Parasitology and pathology of marine organisms of the World Ocean." March 1985, iv + 135 p. (37 papers.)

IGFA members as part of their \$20 membership fee.

## Developing U.S. Marine Recreational Fisheries

"Marine Recreational Fisheries 9," published for the International Game Fish Association, National Coalition for Marine Conservation, and the Sport Fishing Institute by the NCMC, is devoted entirely to the discussions of the many facets of marine recreational fisheries development at the Ninth Annual Marine Recreational Fisheries Symposium. And, like previous symposia and resulting publications, this one is divided into several panels.

In Panel 1, an introduction to fisheries development chaired by Robert G. Hayes, Richard B. Thompson of the NMFS Northwest Regional Office reported the latest data on marine anglers, angling, and harvests. John T. Everett, Chief, NMFS Policy and Planning Staff, discussed fisheries development in relation to marine recreational fishing, while Eugene S. Fritz and Francis M.

Schuler, with the National Sea Grant College Program addressed the question "Why develop MRF?"

In Panel 2, the marine recreational fishing industry chaired by Carl R. Sullivan, angler and guide Ron Young provided a sportsman's view of some of the problems and needs of MRF while William P. DuBose, IV, and Gilbert C. Radonski examined the problems confronting the marine recreational fishing industry. Tackle manufacturer Richard J. Kotis discussed and recommended strategies for a strengthened fishing tackle industry.

Panel 3, chaired by Bartlett Theberge, focused on angler needs. Anthony Fedler examined the motivations for marine angling, how they were related to satisfaction in angling, and discussed resultant management and development implications. Charles J. Moore discussed the data available, and the information needs of marine anglers and the role of providing that information in fisheries development and management. And, Michael P. Voiland, Jr., outlined needs and new initiatives for coastal fishing access.

Panel 4, chaired by John M. Green, dealt with the potential for expanded utilization of fisheries resources. John Boreman, Michael P. Sissenwine, Merton C. Ingham, and Wallace G. Smith examined opportunities for MRF enhancement; Jay D. Hair discussed habitat constraints on MRF and how to enhance habitat; Peter A. Larkin provided a look at the role of development in fisheries management; and Ronald L. Schmied reviewed the tools and methods for marine recreational fisheries development.

Panel 5, chaired by Robert E. Stevens, was keyed to "Development and the Management Process." James T. Barrett reviewed some of the challenges of fisheries development for fisheries managers; James A. Timmerman, Jr., discussed the institutional constraints on MRF development; and Donald L. Schultze and Robert C. Fletcher discussed the integration of interests of marine anglers with marine interests that impinge on marine angling and resources.

Finally, Panel 6, moderated by Frank E. Carlton, provided each Panel chair-

man's recommendations for action—the summaries of the views of the various panelists and audience from the Chairman's perspective as summed up and elaborated on by the Panel chairmen. The volume represents an excellent summary of the problems, dilemmas, challenges, and opportunities for the development of marine recreational fishing. Hardbound, the 218-page volume is available from the IGFA for \$15.00; all nine volumes are available for \$50.00.

## Studying the Gray Whale

**"The Gray Whale, *Eschrichtius robustus*,"** edited by Mary Lou Jones, Steven L. Swartz, and Stephen Leatherwood and published by the Academic Press, Inc., Orlando, FL 32887, contains a wide range of excellent contributions from scientists working in Canada, Japan, Mexico, the United States of America, and the Soviet Union. It is a fine up-to-date compendium of information on the species.

Sole member of the family Eschrichtiidae, the gray whale is considered by many to be the most primitive living baleen whale and it is important for many reasons—economically, aesthetically, scientifically, etc. Much work has been done on it since publication of Rice and Wolman's "The Life History and Ecology of the Gray Whale" in 1971 and the 1974 special issue of the *Marine Fisheries Review*, 36(4):1-64, which was devoted to articles on "Gigi," a young captive gray whale studied for a year and then released.

This new volume presents articles in Section I on gray whale evolution, fossils, and subfossil remains from both the Pacific and Atlantic Ocean areas, the latter indicating that the species was taken commercially in American colonial times. Section II documents historical relationships and exploitation by the Japanese and by American Indians, and describes early and modern commercial pelagic hunting of gray whales by Norwegians, Soviets, Japanese, and Americans. Included is important data on and analyses of ethnographic, historical, and archaeological aspects of gray whale hunting.

A third section reviews current knowledge on gray whale demography, distribution, and migrations: Stephen Reilly reviews efforts to assess gray whale abundance; David Rugh reports on censuses at Unimak Pass, Alaska, Nov.-Dec. 1977-79; Howard Braham thoroughly reviews distribution and migration of the species in Alaskan waters; and James Darling reports on gray whale studies off Vancouver Island, B.C. Other contributions discuss migration research along the Oregon coast (1978-81); demography and phenology of gray whales and evaluation of whale-watching activities in Laguna San Ignacio, Baja California Sur, Mexico; the gray whale's reoccupation of Laguna Guerro Negro, Baja California; their migration corridors along the central California coast, 1980-82; and Soviet studies of distribution and numbers in the Bering and Chukchi Seas, 1968-82.

The final section, on biology and behavior, presents papers on gray whale feeding ecology, foraging along Vancouver Island's west coast, a review of Soviet research on the species' biology and commercial whaling, a report on investigations of gray whales taken in the coastal waters of Russia's Chukchi Sea, gray whale sound production studies in winter and summer ranges, dive characteristics and movements of radio-tagged gray whales in San Ignacio Lagoon, and ocean movements of radio-tagged gray whales.

While the gray whale returned to healthy numbers, it has also been very accessible to researchers. This volume reflects the results of many important research programs and will be a valuable reference. Indexed and well illustrated with maps, photographs, and much original art, the 600-page hardbound volume is available from the publisher for \$75.00.

## *Edible Marine Animals of the Pacific Coast*

**"The Printers Catch,"** subtitled "An Artist's Guide to Pacific Coast Edible Marine Animals," has been published by Sea Challengers, 4 Sommerset Rise, Monterey, CA 93940. The author,

Christopher M. Dewees, is a marine resources specialist with the University of California at Davis.

The 112-page volume, 10" × 8", is handsomely printed and is a nice combination of art and natural history, perhaps most interesting for its utilization of genuine fish prints or "gyotaku," the Japanese art of fish printing revived in the United States by some NOAA Sea Grant programs. Since all the original fish prints, done on handmade oriental papers, are made directly from the fish itself, an exact image is produced.

Thus, the volume is more than a simple field guide. The author has covered 32 of the most important fish families of the Pacific coast, (including several mollusks and crustaceans). For each, he has also provided pertinent data on the particular species' life history, fisheries, and consumer information. In addition, he provides historical data on gyotaku, tells how to do it, and lists sources of supplies. Also included is a glossary of fishery terms, illustrations of fishing gears, and a list of references for more detailed information on the various species.

In all, there are 43 color and 22 black and white illustrations for species ranging from various Southern California kelp bed fishes, to albacore, white sturgeon, and yellowtail, and including several rockfishes, Pacific salmon, northern anchovy, lingcod, sculpins, abalone, squid, Dungeness crab, spot prawn, cabezon, halibut, pile perch, Pacific barracuda, wolf-eel, rock sole, and more. The hardbound volume is available from the publisher for \$26.95.

## The Care, Preservation, and Cooking of Sharks

One of the most thorough books on shark utilization is **"Cook's Book, A Guide to the Handling and Eating of Sharks and Skates,"** by Sid Cook, published by G. A. Bonham, Corvallis, Ore. The author, a consulting scientist, has had wide experience with sharks, including fishery development, shark studies and electronic tracking, etc., and sport fishing for sharks.

Well illustrated, the volume provides

historical references and up-to-date data on shark eating and attitudes toward sharks, how to purchase shark (and common varieties available by region), how to butcher and handle fresh-caught sharks and skates, urea removal, preparation of and cooking methods for fresh and thawed shark; freezing, smoking, salting, and drying shark; and nutritional values of shark.

A section on shark cookery provides 50 tested recipes for shark and skate varying from Teriyaki Shark, Ginger Shark and Requin Provencale to Boiled, Broiled, Poached, Curried, Steamed, and Barbecued Shark, and more. Also listed is Ray in Caper Sauce, a traditional French recipe, and directions on making imitation crab from skate.

Appendices provide directions on preparing shark jaws and teeth as mementoes of the catch, removing and preparing shark fins for personal or commercial use, preparation of shark hides, and, finally, selecting wines to serve with shark. All in all, the book is an excellent compendium of data on sharks for the consumer, angler, and commercial fisherman. Indexed and referenced, the 106-page paperback volume is available from Cook's Book, 1023 N.W. 25th Street, Corvallis, OR 97330 for \$10.95 (\$12.95 for international orders payable in U.S. funds). A special waterproof version which resists the marine environment and weather elements is available at \$17.95 (and \$19.95).

### *The Movement and Migration of Fishes*

Publication of "**Fish Migration**" by Brian A. McKeown has been announced by Timber Press, P.O. Box 1631, Beaverton, OR 97075. The author is a Professor in the Department of Biological Sciences, Simon Fraser University, Burnaby, B.C., Canada.

The author begins by defining "migration," and discusses migration direction, periodicity, distance, speed, duration and degree of return, and reviews the basic methods for studying fish migration. A second chapter reviews the various patterns of fish migration; a third discusses the means, methods, and

cues that fish utilize for orientation. Additional lengthy chapters deal with the bioenergetics and physiology involved in fish migrations. Finally, the author reviews ecological and evolutionary factors involved in fish migration. Major portions of the text are devoted to orientation, which includes discussion of the initiation of cues and means of navigation, and to physiological adaptations required for migration.

The patterns of migration discussed include those of the many diadromous species, as well as those of potamodromous fishes, such as kokanee salmon and certain trouts and suckers. Further, the author reviews the migrations of such species as cod and herring. Covered is work up to about 1983 on the topics of orientation, bioenergetics, migratory patterns, behavior, ecology, and evolution.

Fish migration is a topic of considerable interest and use to fishery scientists and managers, and this volume is the first major review of the topic since 1968, and incorporates the discussion on physiological aspects lacking then. The 224-page hardbound volume is amply illustrated with 73 drawings and maps, 14 photographs, and has many tables and a large bibliography. It is available from the Timber Press for \$29.00 and will be of interest to fishery researchers and managers, as well as to students of the behavioral aspects of migration.

More specific is "**Olfactory Imprinting and Homing in Salmon**," by A. D. Hasler and A. T. Scholz, published by Springer-Verlag New York, Inc., 175 Fifth Avenue, New York, NY 10010. It is subtitled "Investigations into the Mechanism of the Imprinting Process," and is based in large part on Scholz's doctoral dissertation, but goes further to trace the evolution of ideas and experiments and focus on fairly recent investigations into olfactory imprinting and homing and the role of endocrines in that process.

The monograph is organized into two parts, with Part I reviewing general information on Pacific salmon life history (especially the coho salmon, *Oncorhynchus kisutch*), evidence for imprinting, early investigations of imprinting to olfactory cues, experiments with arti-

ficially imprinted salmon, natural imprinting, mechanisms of olfactory orientation in upstream migration, and pheromones and homing.

Part II presents, in Chapter 3, a comprehensive review of smolt transformation, including descriptions of the morphological, physiological, and behavioral transitions and control of this metamorphic process. Chapter 4 discusses fluctuations in hormone levels during the spawning migrations and the effects on olfactory sensitivity to imprinted odors. Chapter 5 then discusses thyroid activation of olfactory imprinting in coho salmon and Chapter 6 considers endogenous and environmental factors that influence smolt transformation.

In addition, the authors have provided an interesting review of the general impressions that they have formed on the life history, behavior, physiology, and ecology of salmon over many years of study. Thus, the monograph is something of a chronological account of the author's and their associates' investigations and the evolution of their experiments, investigations, beliefs, and hypotheses.

The book is Volume 14 in the publisher's Zoophysiology series which also includes "The Ethology of Predation" by E. Curio (vol. 7) and "Diversity and Adaptation in Fish Behavior" by M. H. A. Keenleyside (vol. 11). Indexed and with an extensive list of references, the 134-page hardbound volume is available from the publisher for \$29.00.

### **On the Management of Marine Fisheries**

"**Fishery Management**," by J. L. McHugh is Volume 10 in the series "Lecture Notes on Coastal and Estuarine Studies," published by Springer-Verlag, 175 Fifth Avenue, New York, NY 10010.

The volume reflects the author's many years of fisheries teaching at the State University of New York's Stony Brook campus and his interest in the philosophy and practice of fisheries management. He provides very broad, if often brief reviews of many aspects of U.S.

marine fisheries and the way they are or have been managed, and the book is essentially a series of case histories chosen to reflect various successes or failures in marine fisheries research and management, including those of several international bodies.

In 19 chapters, the author discusses marine fisheries research, the U.S. fisheries as a whole, the oyster industry, blue crab fishery, the Pacific sardine and Atlantic mahaden industrial fisheries, marine sport fisheries, interstate marine fisheries compacts, the International Whaling Convention, International Pacific Salmon Convention, North Pacific Fur Seal Convention, and the International Convention for the High Seas Fisheries of the North Pacific Ocean, and others. In addition, he reviews fishery oceanography and fishery economics, and a final summary chapter highlights the significant aspects of the book and provides several suggestions for improving marine fisheries research and management. Included are species and subject indexes; the 207-page paperbound volume is available from the publisher for \$17.00.

### **Classic Marine Survival Guide Revised, Expanded**

The fourth edition of "**How to Survive on Land and Sea**," has been published by the Naval Institute Press, Annapolis, MD 21402. Originally authored by Frank C. Craighead, Jr., and John J. Craighead, this latest edition has been revised and updated by survival experts Ray E. Smith and D. Shiras Jarvis. The original was issued by the Aviation Training Division of the office of the Chief of Naval Operations in 1943.

This new edition has been expanded, often with information developed either by or for NOAA agencies, and is divided into three parts: Water Survival, Land Survival, and Natural Disasters Survival. The sections dealing with cold water and seashore survival, water survival, abandoning ship and survival swimming, and environmental hazards at sea will be most useful to those who work on or study the sea. Of additional

value are the sections on natural disaster survival and first aid, land survival; plant, animal, and fish foods; fire-making and cooking, travelling, environmental hazards, tropical rain forest survival, and desert survival.

The authors have brought the book up to date on the latest methods for coping with hypothermia and other aspects of surviving hazardous climates and situations. The introduction discusses establishing survival priorities, mental strength and physical readiness, realistic assessment of abilities, preparation of survival kits and medication needs, and signalling, including material on ELT, EPIRB, and the SARSAT system concept.

Also included is a folded map of the world's principal vegetative regions and the world distribution of natural hazards, showing iceberg drift areas, earthquake epicenters, tropical storm tracks, volcanoes, and areas of likeliest tsunami impact, tornado occurrence, winter and monsoon gales of Beaufort 7 and greater at least 30 percent of the time in season, greatest tropical storm incidence, and thunderstorms (more than 100 days per year).

Indexed, the volume also presents general and specific bibliographies for those wanting to locate original sources of survival data. The 414-page softbound volume is available from the publisher for \$14.95.

### **Developing and Marketing U.S. West Coast Squids**

"**Proceedings of the West Coast Squid Symposium**," prepared by the West Coast Fisheries Development Foundation (WCFDF) and the Oregon State University Sea Grant Marine Advisory Program, presents the record of the 1983 meeting on the *Loligo opalescens* resource, pertinent fishing techniques, marketing strategies, and much more. Participants included many U.S. experts in squid harvesting and marketing, as well as commercial fishermen and squid biologists.

Presentations included papers on *Loligo* distribution, biology, and life history; east coast squid fisheries, Califor-

nia's squid fishery and light fishery; and on squid trawling gear, jigging gear, and techniques for their use. The volume also includes informative panel discussions of Japanese squid fisheries, development of Oregon's squid fishery, squid handling and processing for export markets, processing automation, and developments in squid marketing. An appendix presents selected local and world squid landing statistics. The 150-page paperbound volume presents much useful information for those interested in getting started in fishing for or marketing squid and is available from the WCFDF, 812 S.W. Washington, Suite 900, Portland, OR 97205 for \$6.00.

### **The Study of Sticklebacks**

Publication of "**A Functional Biology of Sticklebacks**" by R. J. Wootton has been announced by the University of California Press, 2120 Berkeley Way, Berkeley, CA 94720, as the second volume in its Functional Biology Series. The author, Lecturer in the Department of Zoology, University College of Wales, utilizes his own research into stickleback biology and ecology and many other studies to provide succinct reviews of stickleback distribution, habitats, and migrations; their morphology and anatomy and systematic position; foraging and feeding characteristics; effects of environmental factors on sticklebacks and their metabolism and energetics; reproduction, growth, and production; interspecific relationships, population dynamics, ecological genetics, and life history strategies.

Sticklebacks have figured in many studies of fisheries ecology and ethology and this volume is a fine review of how these species utilize spatial habitat, food supplies, etc., and the patterns of growth, survivorship, and reproduction that result. It integrates physiological, ethological, and ecological characteristics to show how the stickleback is adapted to and succeeds in its environment. Indexed and with extensive references, the 265-page hardbound volume is available from the publisher for \$29.75.